TITLE OF THE INVENTION:

ELECTRIC GAS LIGHTER

The present invention relates to an electric gas lighter which may be used, for example, on the gas range of a gas cooker.

BACKGROUND OF THE INVENTION

Electric gas lighters for producing sparks to light burners on the gas range of a gas cooker are known, and normally comprise a lighting circuit fitted underneath the gas range and for generating the sparks; and one or more hand-operated switches for activating the lighting circuit.

More specifically, the lighting circuit is connected to a power line having a neutral line and a phase line supplying alternating voltage, and comprises two enabling terminals, one of which is connected to the neutral line.

The normally-open hand-operated switches are connected in parallel between the enabling terminals of the lighting circuit, and, being hand-operated by the user, are formed on the flame-regulating panel of the gas range. Push-button switches are normally used, and are preferably activated by the flame-regulating knobs which,

when pressed, close a contact to allow gas flow through the respective burners.

Known gas lighters have several drawbacks. In particular, since the hand-operated switches are located some distance from the lighting circuit, each must be provided with two wires for electric connection to the enabling terminals of the lighting circuit. Consequently, the lighting circuit must be provided with two terminals for connection to the respective wires and is therefore unduly bulky and complicated to produce. Moreover, the presence of two wires between the lighting circuit and hand-operated switches makes it difficult to assemble the lighters to the respective burners.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a gas lighter designed to eliminate the aforementioned drawbacks, and which, in particular, is compact, is cheap and easy to produce, and can be fitted easily to a respective gas range.

According to the present invention, there is provided an electric gas lighter comprising a lighting circuit for generating sparks at at least one burner; said lighting circuit being connected to a power line supplying a supply voltage, and having an enabling terminal for enabling spark generation when connected to a reference-potential line, or disabling spark generation when floating; characterized by comprising hand-operated switching means having at least one first terminal

connected to said enabling terminal of said lighting circuit by a connecting line; and at least one second terminal connected to said reference-potential line.

The hand-operated switches are connected to the reference-potential (ground) line by simply connecting the second terminals of the switches to the gas range, so that connection to the neutral line of the power line is no longer required, and only one wire is required from the lighting circuit to the hand-operated switches. By only requiring one enabling terminal to connect the control terminal of the controlled switch to the hand-operated switches, the lighting circuit is therefore more compact and easier to produce; and, there being only one wire between the lighting circuit and the hand-operated switches, the gas lighter is easier to fit to the gas range.

BRIEF DESCRIPTION OF THE DRAWING

A non-limiting embodiment of the invention will be described by way of example with reference to the accompanying drawing, which shows a circuit diagram of a gas lighter in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

As shown in the accompanying drawing, an electric gas lighter, indicated as a whole by 1, is connected to a gas range 2 of a gas cooker. More specifically, gas lighter 1 is housed at least partly in a casing (not shown for the sake of simplicity) fitted in known manner to gas range 2.

Gas range 2 is made of conducting material, preferably metal, and comprises a number of burners 3 connected to respective regulating knobs 4 for regulating gas flow through burners 3.

Gas lighter 1 comprises a lighting circuit 5 for generating sparks at burners 3; and a number of hand-operated switches 7, each for and located at a respective regulating knob 4.

Lighting circuit 5 has a first and second input terminal 8, 9 connected respectively to a phase line and a neutral line of a power line supplying an alternating supply voltage V_S; an enabling terminal 12; and output terminals 13 connected to respective electrodes 13a located close to burners 3 and insulated electrically from gas range 2 to generate sparks and ignite the gas.

Lighting circuit 5 comprises a discharge-generating circuit 14, in turn comprising a storage capacitor 19 and a discharge resistor 20 connected parallel, downstream from an electronically controlled switch 24, between a first and second node 15, 16; a discharger 21; and a transformer 22. Discharger 21 - preferably a gas discharge tube (GDT) - has one terminal connected to first node 15, and is also connected in series to a primary winding 22a of transformer 22, in turn connected to second node 16. Transformer 22 also comprises at least one secondary winding 22b (two in the embodiment described) connected between two respective output terminals 13 of lighting circuit 5.

Lighting circuit 5 comprises electronically controlled switch 24; an activating divider 25; a rectifier diode 26; and a filtering capacitor 27. More specifically, electronically controlled switch 24 has a control terminal 24a; a first terminal connected to first node 15; and a second terminal connected to the cathode 26a of rectifier diode 26, the anode 26b of which is connected to first input terminal 8 of lighting circuit 5 via a first input resistor 30. Electronically controlled switch 24 is preferably defined by a PNP bipolar transistor having the emitter terminal connected to cathode 26a of rectifier diode 26, the collector terminal connected to first node 15, and the base terminal forming control terminal 24a.

Activating divider 25 is located between the second terminal of electronically controlled switch 24 and enabling terminal 12, to which it is connected via a shutdown diode 31, and has an intermediate node connected to control terminal 24a of electronically controlled switch 24.

Filtering capacitor 27 has a first terminal connected to second node 16, in turn connected to the second input terminal via a second resistor 34. A second terminal of filtering capacitor 27 is connected to a ground terminal 32 connected to a constant-potential ground line 33.

Hand-operated switches 7 have respective first terminals connected to enabling terminal 12 of lighting

circuit 5 by a wire 35, and respective second terminals connected to ground line 33, so that hand-operated switches 7 are connected in parallel. Hand-operated switches 7 are normally-open types and are closed to connect enabling terminal 12 to ground line 33 when respective regulating knobs 4 are pressed.

Both ground terminal 32 and the second terminals of hand-operated switches 7 are connected to ground line 33 by direct connection to gas range 2, which is made of conducting material, so that lighting circuit 5 and hand-operated switches 7 are connected to one another exclusively by wire 35.

Gas lighter 1 operates as follows.

When hand-operated switches 7 are all open, enabling terminal 12 and control terminal 24a are at the potential of cathode 26a of rectifier diode 26, and electronically controlled switch 24 is open (the transistor defining electronically controlled switch 24, in fact, is disabled), so that gas lighter 1 draws no current and, since the primary winding 22a of transformer 22 is not energized, no spark is generated.

When one of regulating knobs 4 is pressed, the corresponding hand-operated switch 7 is closed, enabling terminal 12 is connected to ground line 33, and the control terminal 24a of electronically controlled switch 24 is also connected to ground line 33 by a branch of activating divider 25 and shutdown diode 31, thus enabling spark generation. More specifically, during

positive half-waves of supply voltage V_S, electronically controlled switch 24 is closed (the transistor defining electronically controlled switch 24 conducts), so that storage capacitor 19 is charged to a predetermined threshold voltage. When the threshold voltage is exceeded, storage capacitor 19 discharges to primary winding 22a of transformer 22 via discharger 21, so that the secondary winding 22b is also energized to generate sparks between electrodes 13a and respective burners 3.

Clearly, changes may be made to the gas lighter as described herein without, however, departing from the scope of the present invention. In particular, hand-operated switches 7 described may be replaced with a single hand-operated push-button switch operated separately and independently of regulating knobs 4 and connected between ground line 33 and enabling terminal 12 by wire 35.

Lighting circuit 5 may also be formed otherwise than as described. For example, electronically controlled switch 24 may be defined by a silicon controlled rectifier (SCR) or by a different type of electronic switch; and lighting circuit 5 may be modified in obvious manner for negative half-wave operation.